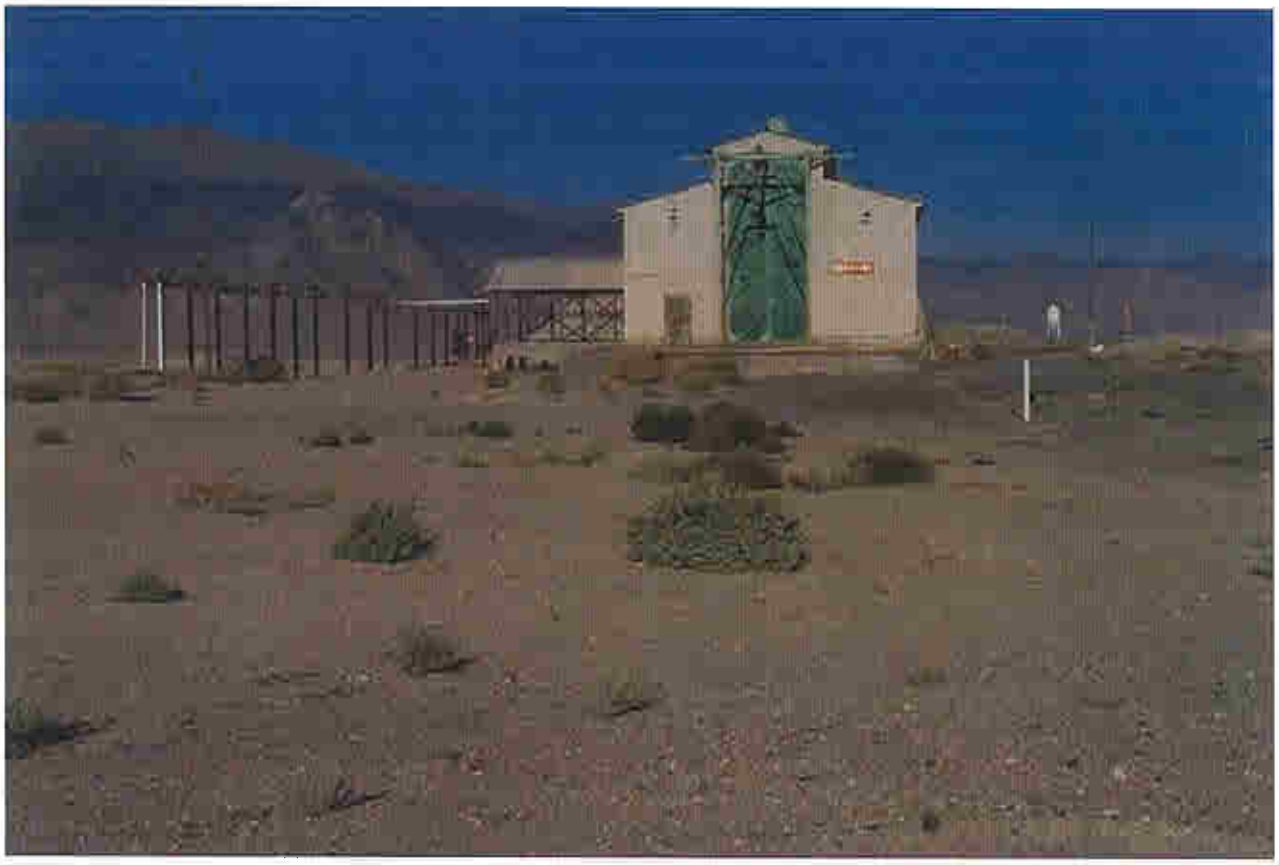
Decision Document

Solid Waste Management Unit B-32
Building 101-41 Catchment Pit
Hawthorne Army Depot
Hawthorne, Nevada



SWMU - B32

September 2000

Hawthorne Army Depot

Decision Document SWMU B-32

September 2000

The selected remedy is protective of human health and the environment. It has been shown that a complete pathway to human health and the environment does not exist, and there is no potential for an exposure pathway to be completed in the future.

U. S. Army

07 NOV 2000

Anne L. Davis
Lieutenant Colonel, U.S. Army
Commanding

State of Nevada

20 April 2001

Paul Liebendorfer
Chief, Bureau of Federal Facilities

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SWMU B-32
Building 101-41 Catchment Pit
HAWTHORNE ARMY DEPOT
HAWTHORNE, NEVADA

1.0 Introduction:

This decision document describes the rationale for the proposed closure of SWMU B-32, building 101-41 catchment pit, at the Hawthorne Army Depot (HWAD), Hawthorne, Nevada. This document was prepared by the U.S. Army Corps of Engineers, Sacramento District, with the help of HWAD for the Nevada Department of Environmental Protection (NDEP).

Tetra Tech, Inc. (Tt), and Ecology and Environment (E&E) were tasked by the US Army Corps of Engineers, Sacramento District (USACE), to perform remedial investigations and ground water monitoring at the Hawthorne Army Depot (HWAD), Hawthorne, Nevada. These tasks were conducted from 1993 through 1997, primarily at solid waste management units (SWMUs) designated by the Army and the Nevada Division of Environmental Protection (NDEP). The NDEP is the lead regulatory agency for environmental issues at HWAD. The purpose of the sampling was to determine the extent and degree of environmental impacts, if any, associated with activities performed at each SWMU. The primary goal of the investigation was to assess the environmental impacts and to report the findings, present conclusions, and recommend any remediation, if necessary.

With guidance from the NDEP, basewide proposed closure goals (PCGs) for soil were established as acceptable levels so that SWMU closure could be recommended and to assist in directing the investigative efforts toward those SWMUs where the target analytes were of greatest concern (Appendix A). These PCGs were used as action levels throughout this investigation and are used for comparison with the detected analytes in this report.

2.0 Site History

SWMU B32 is in the HWAD's central magazine area, on the southeast side of the 101 Production Area (Figure 1-1). SWMU B32 is an inactive unlined catchment pit located 185 feet east of Building 101-41 (Figure 1-2). The catchment pit measures 35 feet by 15 feet and is up to 3 feet deep. The catchment pit has been eroded and partially filled with windblown sand.

The USACE, HWAD, and the NDEP agreed to define the boundaries of each SWMU using annotated monuments and survey pins. As part of E&E's 1997 field investigations, a survey monument was constructed and surveyed at SWMU B32. A brass survey pin on

the monument designates the monument number HWAAP-105-1996 and the SWMU number B32, respectively. Three corner pins were set and surveyed to define the SWMU boundary, with the monument as the northwest corner. The location of these corner markers and the SWMU boundary are shown on Figure 1-2. The survey data for this SWMU are presented in Appendix B.

3.0 Site Conditions

The catchment pit at SWMU B32 reportedly was in operation from 1940 to the early 1970s and may have received wastewater containing TNT and cyclotrimethlyenetrinitramine (RDX).

Soils encountered during E&E's investigation of SWMU B32 were composed of silty fine- and medium-grained sands. Explosive-stained soil was not observed on the surface of the pit or in any of the hand auger samples collected beneath the bottom of the catchment pit at HA01 (E&E 1995).

Based on the past uses of the pit and on observations made during the previous site investigations, the target analytes are known to be explosives and metals.

4.0 INVESTIGATIONS

Site inspections of SWMU B32 were conducted by the USAEHA (1988), Jacobs Engineering (1988), and RAI (1992). During these inspections, evidence of TNT-stained soil was not noted in the catchment pit. No investigation activities were conducted during these inspections, and no soil samples were collected from the SWMU at that time.

One surface soil sample and one near-surface soil sample were collected from sample location HA01 at SWMU B32. Sample location HA01 was located in the center of the catchment pit at the lowest elevation in the pit to assess the potential impact from the explosive wastewater that would tend to accumulate in this area.
The subsurface investigation at SWMU B32 consisted of one CPT sounding with an adjacent sample boring, CPS01, drilled on the west side of the catchment pit as shown on Figure 3-1. The sounding was advanced to a total depth of 40 feet below ground surface (bgs).

5.0 Investigation Results

Arsenic (5.9 mg/kg and 12 mg/kg), barium (98 mg/kg and 280 mg/kg), total chromium (6 mg/kg and 6.6 mg/kg), and lead (8.4 mg/kg and 13 mg/kg) were detected in both the surface and near-surface soil samples collected at the SWMU. No other metals were detected in the samples (E&E 1995).

Arsenic (2.3 mg/kg to 14 mg/kg), barium (89 mg/kg to 180 mg/kg), total chromium (3.2 mg/kg to 7.8 mg/kg), and lead (3.2 mg/kg to 5.3 mg/kg) were detected in all of the subsurface soil samples collected at CPS01.

Laboratory results of the two hand-auger surface samples detected TNT at 0.22 mg/kg and 5.7 mg/kg. No explosives were detected in any of the subsurface samples collected at this SWMU (appendix C).

The detected metals in the subsurface soil samples included arsenic, barium, total chromium, and lead. All of these metals were reported at concentrations that did not exceed their PCGs or their maximum expected background concentrations. Because there was no obvious release of these metals to the subsurface soils at this SWMU, it appears that the concentrations of these metals are naturally occurring. Based on the previous site inspections, the remedial investigation data collected by E&E in 1994, and the above interpretation of these data, there does not appear to have been a release of metals that has impacted the subsurface soil at SWMU B32.

Inspite of the high detections of TNT and RDX using the field screening tests in 1994 the laboratory analysis of the same samples only detected very low levels of explosives. Based on the laboratory analysis there appears to be no release of explosives above PCG's at this SWMU.

6.0 Remediation

The site was used to do a pilot test of a static pile composting. 100 CY of soil was used in the static pile composting test. The soil and amendments were mixed, watered, placed in an excavation and covered with hay. The excavation used was the pit area at SWMU B-32.

7.0 Remediation Results

The sampling results of the static test program are presented in appendix D. All of the test results indicated contamination levels below cleanup goals. TNT was detected at a maximum of 8.28 mg/kg (goals 40 mg/kg) and the maximum RDX detection was 18.5 mg/kg (goals 64 mg/kg). In addition DZHC collected three soil samples from under the static pile. The highest detection from this sampling event was a TNT detection at 0.33 mg/kg. DZHC's sampling results are presented in appendix D. The static pile area was covered with a 6" layer of clean soil and graded to drain.

8.0 Public Involvement:

It is the U.S. Department of Defense and Army policy to involve the local community throughout the investigation process at an installation. To initiate this involvement, HWAD has established and maintains a repository library at the local public library. This

repository includes final copies of all past studies and other documents regarding environmental issues at HWAD. As future environmental documents are made available to HWAD the repository shall be updated.

HWAD has solicited community participation in establishment of a restoration and advisory board (RAB). To date there has been insufficient response and HWAD has not formed a RAB. HWAD has held open houses to inform the public of on going environmental issues. HWAD shall continue to solicit community involvement, and will establish a RAB should sufficient community interest be obtained.

9.0 Conclusions

SWMU B-32 should be closed with the restrictions that no structure be constructed on the SWMU, that the site remain only for industrial use and documented on the depot site master plan.

10.0 REFERENCES

Ecology and Environment. 1995. RCRA Facility Assessment Report for 24 Solid Waste Management Units, Hawthorne Army Depot, Hawthorne, Nevada. April 1995.

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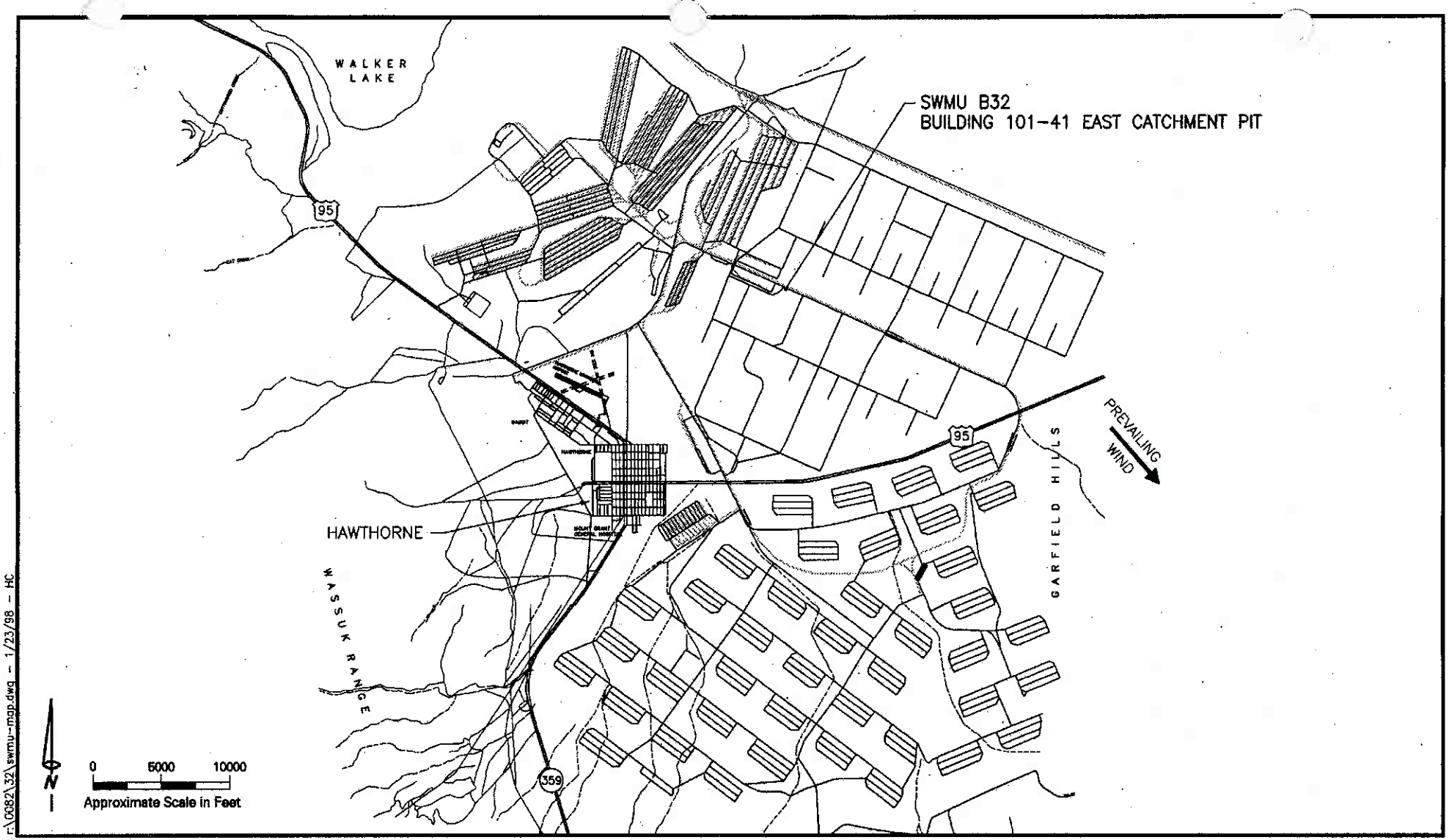

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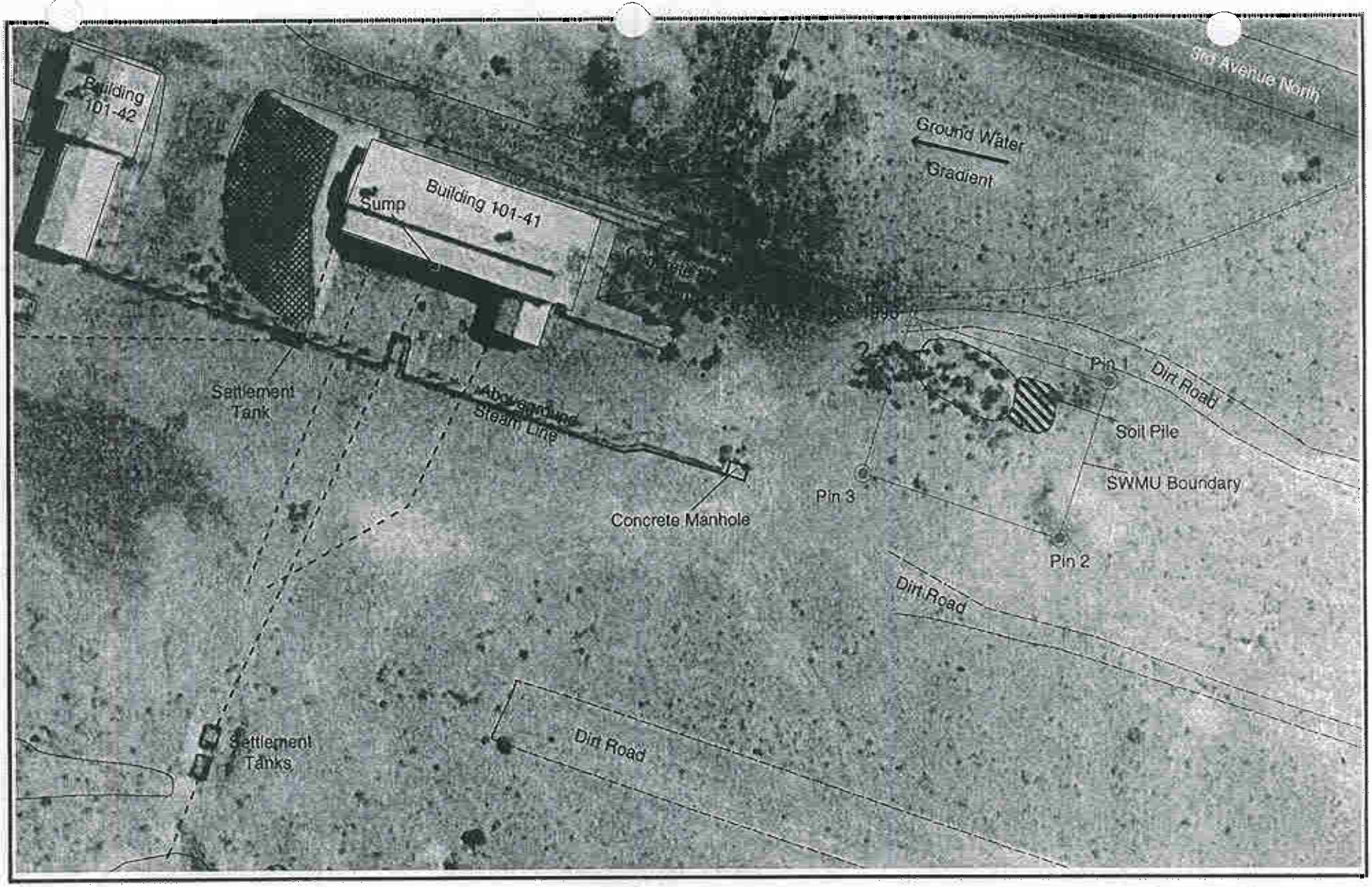
SOURCE: TETRA TECH FINAL DATA PACKAGE, 1996 (REV. 1997)

Site Location Map
SWMU B32
Building 101-41 East Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Figure 1-1

Tetra Tech, Inc.



Workspace: HWAD.WOR

Legend:

- Boundary Corner Pin
- Explosion Barrier
- Drain Line
- Railroad
- SWMU Monument

N

0 30 60

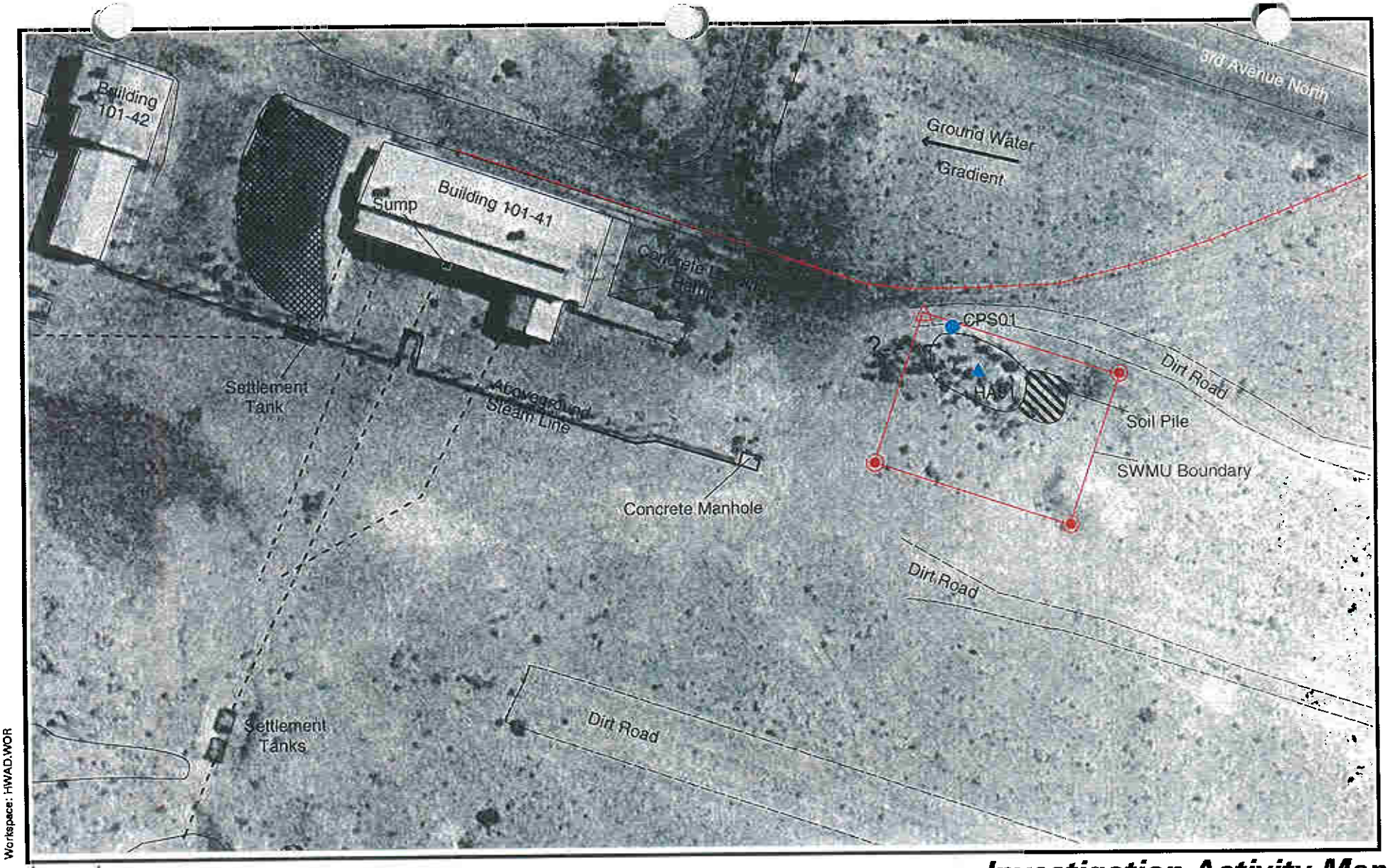
Approximate Scale in Feet

Tetra Tech, Inc.

Site Map
SWMU B32
Building 101-41 Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Figure 1-2



Workspace: HWAD.WOR

Legend:

- Boundary Corner Pin
- Hand Auger Location
- Soil Boring Location
- Explosion Barrier
- Drain Line
- Railroad
- SWMU Monument

N

0 30 60

Approximate Scale in Feet

Investigation Activity Map
SWMU B32
Building 101-41 Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Figure 3-1

Tetra Tech, Inc.

Appendix A

Proposed Closure Goals
Hawthorne Army Depot
Hawthorne, Nevada

Constituent of Concern	Chemical Classification	Carcinogenic (C) or Non-carcinogenic (NC)	HWAD Proposed Closure Goals for Soil (mg/kg)	HWAD Proposed Closure Goal Source
Nitrate	Anion	NC	128,000	Calculated Subpart S[a]
2-Amino-dinitrotoluene	Explosive	NC	-	NA[b]
4-Amino-dinitrotoluene	Explosive	NC	-	NA
1,3-Dinitrobenzene	Explosive	NC	8	Calculated Subpart S
2,4-Dinitrotoluene	Explosive	NC	160	Calculated Subpart S
2,6-Dinitrotoluene	Explosive	NC	80	Calculated Subpart S
HMX	Explosive	NC	4,000	Calculated Subpart S
Nitrobenzene	Explosive	NC	40	Calculated Subpart S
Nitrotoluene (2-, 3-, 4-)	Explosive	NC	800	Calculated Subpart S
RDX	Explosive	NC	64	Calculated Subpart S
Tetryl	Explosive	NC	800	Calculated Subpart S
1,3,5-Trinitrobenzene	Explosive	NC	4	Calculated Subpart S
2,4,6-Trinitrotoluene	Explosive	C	233	Calculated Subpart S
Aluminum	Metal	NC	80,000	Calculated Subpart S
Arsenic (cancer endpoint)	Metal	C & NC	30	Background[c]
Barium and compounds	Metal	NC	5,600	Calculated Subpart S
Beryllium and compounds	Metal	C	1	Background
Cadmium and compounds	Metal	NC	40	Calculated Subpart S
Chromium III and compounds	Metal	NC	80,000	Calculated Subpart S
Lead	Metal	NC	1000	PRG[d]
Mercury and compounds (inorganic)	Metal	NC	24	Calculated Subpart S
Selenium	Metal	NC	400	Calculated Subpart S
Silver and compounds	Metal	NC	400	Calculated Subpart S
Acenaphthene	PAH	NC	4,800	Calculated Subpart S
Benzo[a]anthracene	PAH	C	0.96	Calculated Subpart S
Benzo[a]pyrene	PAH	C	0.10	Detection Limit[e]
Benzo[b]fluoranthene	PAH	C	0.96	Calculated Subpart S
Benzo[k]fluoranthene	PAH	C	10	Calculated Subpart S
Chrysene	PAH	C	96	Calculated Subpart S
Dibenz[ah]anthracene	PAH	C	0.96	Calculated Subpart S
Fluoranthene	PAH	NC	3,200	Calculated Subpart S
Fluorene	PAH	NC	3,200	Calculated Subpart S
Indeno[1,2,3-cd]pyrene	PAH	C	-	NA
Naphthalene	PAH	NC	3,200	Calculated Subpart S
Pyrene	PAH	NC	2,400	Calculated Subpart S
Total Petroleum Hydrocarbons as Diesel (TPH-d)	PAH	C	100	NOEP Level Clean-up[f]
Polychlorinated biphenyls (PCBs)	PCBs	C	25	TSCA[g]
Bis(2-ethylhexyl)phthalate (DEHP)	SVOC	C	1,600	Calculated Subpart S
Bromoform (tribromomethane)	SVOC	C	89	Calculated Subpart S

Proposed Closure Goals
Hawthorne Army Depot
Hawthorne, Nevada

Constituent of Concern	Chemical Classification	Carcinogenic (C) or Non-carcinogenic (NC)	HWAD Proposed Closure Goals for Soil (mg/kg)	HWAD Proposed Closure Goal Source
Butyl benzyl phthalate	SVOC	NC	16,000	Calculated Subpart S
Dibromochloromethane	SVOC	C	83	Calculated Subpart S
Dibutyl-phthalate	SVOC	NC	8,000	Calculated Subpart S
Diethyl phthalate	SVOC	NC	64,000	Calculated Subpart S
Phenanthrene	SVOC		-	NA
Phenol	SVOC	NC	48,000	Calculated Subpart S
Acetone	VOC	NC	800	Calculated Subpart S
Anthracene	VOC	NC	24,000	Calculated Subpart S
Benzene	VOC	C	24	Calculated Subpart S
Bis(2-chloraisopropyl)ether	VOC	C	3,200	Calculated Subpart S
Bromomethane	VOC	NC	112	Calculated Subpart S
Carbon tetrachloride	VOC	C	5	Calculated Subpart S
Chlorobenzene	VOC	NC	1,600	Calculated Subpart S
Chloroform	VOC	C	115	Calculated Subpart S
Chloromethane	VOC	C	538	Calculated Subpart S
Dibromomethane	VOC	C	0.008	Calculated Subpart S
1,2-Dichlorobenzene	VOC	NC	7,200	Calculated Subpart S
1,4-Dichlorobenzene	VOC	C	13,300	Calculated Subpart S
Dichlorodifluoromethane	VOC	C	16,000	Calculated Subpart S
Ethylbenzene	VOC	NC	8,000	Calculated Subpart S
Methylene bromide	VOC	NC	800	Calculated Subpart S
Methylene chloride	VOC	C	4,800	Calculated Subpart S
2-Methylnaphthalene	VOC		-	NA
1,1,2,2-Tetrachloroethane	VOC	C	35	Calculated Subpart S
Tetrachloroethylene (PCE)	VOC	C & NC	800	Calculated Subpart S
Toluene	VOC	NC	16,000	Calculated Subpart S
1,1,1-Trichloroethane	VOC	NC	7,200	Calculated Subpart S
Trichloroethylene (TCE)	VOC	C & NC	480	Calculated Subpart S
Trichlorofluoromethane	VOC	NC	24,000	Calculated Subpart S
1,2,3-Trichloropropane	VOC	C	480	Calculated Subpart S
Vinyl chloride	VOC	C	0.37	Calculated Subpart S
Xylene Total (m-, o-, p-)	VOC	NC	160,000	Calculated Subpart S
2,3,7,8-TCDD	Dioxin	C	0.000005	Calculated Subpart S

[a] RCRA 55 FR 30870

[b] Not available

[c] Highest background concentration detected in 50 background soil samples

[d] Smucker, Stanford J. USEPA Rgion IX, Preliminary Remedial Goals, Second Half, Sep. 1995

[e] Method detection limit for Volatile Organic Compounds by EPA Method 8260 or

[e] Semi-Volatile Organic Compounds analyzed by EPA Method 8270

[f] Nevada Division of Environmental Protection

[g] Cleanup level for PCB spills in accordance with Toxic Substance and Control Act Spill Policy Guidelines 40 CFR 761

Proposed Excavation Goal (PEG's) by Definitive and Screening * Analysis-
Maximum Concentration of Contaminants
In Soil to Be Left in Place at Depth Below the Surface

Contaminant	Concentration (mg/kg)
2,4,6,-trinitrotoluene (TNT)	800*
2,4-dinitrotoluene (2,4-DNT)	80
2,6-dinitrotoluene (2,6-DNT)	80
1,3,5-trinitrobenzene (1,3,5-TNB)	150
1,3,-drinitrobenzne (1,3-DNB)	NE
2-amino-4,6dinitrotoluene (2-Am-DNT)	NE
4-amino-2,6-dinitrotoluene (4-Am-DNT)	NE
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	4000
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	300
Picric acid	7.0
Pentachlorophenol	NE
Nitroaromatics/Nitroamines	<30

Clean-up Goals by Screening* and Definitive Analysis

Contaminant	Concentration (mg/kg)
2,4,6,-trinitrotoluene (TNT)	40*
2,4-dinitrotoluene (2,4-DNT)	2.6
2,6-dinitrotoluene (2,6-DNT)	2.6
1,3,5-trinitrobenzene (1,3,5-TNB)	4
1,3,-drinitrobenzne (1,3-DNB)	8
2-amino-4,6dinitrotoluene (2-Am-DNT)	NE
4-amino-2,6-dinitrotoluene (4-Am-DNT)	NE
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	100
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	64
Picric acid	7
Pentachlorophenol	None

NE - not established

Appendix B

NOTES

1. FOR THE LOCATION OF THE FOLLOWING SWMU'S, REFER TO FIGURE 3-6 OF THE "FINAL R.C.R.A. FACILITY INVESTIGATION REPORT OF GROUP "A" SOLID WASTE MANAGEMENT UNITS A-04, B-16, B-21, B-24, B-26, AND H-01".

2. THE "HWAD" MONUMENTS AS SHOWN HEREIN AS "[M]", ARE A 1' X 1' X 2'+ CONCRETE MONUMENT WITH A BRASS CAP STAMPED AS PER SPECIFICATIONS. ALL OF THE OTHER CORNERS ARE MARKED BY A 5/8" RE-BAR WITH A PLASTIC CAP STAMPED "STINCHFIELD PLS 3631" UNLESS NOTED OTHERWISE ON THE MAPS.

3. HORIZONTAL DATUM IS BASED ON NAD 83(1994) AND MORE SPECIFICALLY, NGS STATION "W 2". "W 2" IS A FEDERAL BASE NETWORK CONTROL STATION AND IS LOCATED IN THE APPROXIMATE CENTER OF THIS PROJECT.

4. VERTICAL DATUM IS BASED ON NAVD 29. NAVD 88 ELEVATIONS HAVE BEEN SCALED AND THEREFORE ARE NOT ACCURATE. VERTICAL CONTROL USING GPS WAS USED TO ESTABLISH THE ELEVATIONS OF THE EXISTING CONTROL POINTS AND THE "HWAD" MONUMENTS. THE VALUE OF NGS STATION "W 2" WAS USED AS A BASIS FOR THE VERTICAL CONTROL.

5. COORDINATE VALUES OF EXISTING NGS CONTROL, TRAVERSE POINTS, AND HWAD MONUMENTS ARE STATE PLANE COORDINATES, WEST ZONE.

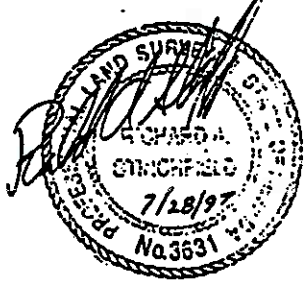
6. THE COMBINED FACTOR WAS CALCULATED USING THE FOLLOWING FIGURES. THE "MAP SCALE" AT POINT "W 2" IS 0.99990022, THE MEAN ELEVATION OF THE TOTAL PROJECT WAS TAKEN AS 4150.00 FEET ABOVE SEA LEVEL AND THE MEAN RADIUS OF THE EARTH WAS TAKEN AS 20,906,000 FEET. THE SEA LEVEL FACTOR WAS CALCULATED AS FOLLOWS: 20,906000/20,906,000 + 4150.00 = 0.999801532. THE COMBINED FACTOR (CF) WAS CALCULATED AS FOLLOWS: 0.99990022 X 0.999801532 = 0.999701772.

7. GROUND DISTANCE X CF (0.999801532) = GRID DISTANCE.

8. GRID DISTANCE X INVERSE CF (1.00298317) = GROUND DISTANCE.

9. COORDINATE VALUES OF ALL OTHER POINTS INCLUDING SWMU CORNERS OTHER THAN "HWAD" MONUMENTS, REFERENCE POINTS, TEST PIT OR HOLE LOCATIONS ETC., WERE CALCULATED USING GROUND DISTANCES AND ARE THEREFORE NOT TRUE STATE PLANE COORDINATES.

10. DISTANCES AS SHOWN ON THESE SWMU'S ARE HORIZONTAL GROUND DISTANCES.



SWMU B32 Survey Data
Hawthorne Army Depot
Hawthorne, Nevada

SWMU	Point ID	Northing (feet)	Easting (feet)	Elevation
B32	HA01	1388254.10	500498.21	4230.507
B32	CPS01	1388274.95	500488.94	4234.423
B32	Pin 3	1388218.31	500448.88	4233.979
B32	Pin 2	1388182.39	500531.40	4236.890
B32	Pin 1	1388246.57	500559.34	4234.982
B32	HWAAP-105-1996	1388282.47	500476.88	4234.467

Notes:

NE = Not established

Coordinate data based on electronic map file using the NAD 1927 datum.

Elevation data based on surveyors map using NGVD 1929 datum.

Appendix C

Metals
Method 6010A (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium Total mg/kg	Silver mg/kg	Arsenic mg/kg	Lead mg/kg	Selenium mg/kg
B32-CPS1-1-009.5	CPS01	5/25/94	9.5	180	<0.52	<0.52	4.8	<1	NA	NA	NA
B32-CPS2-1-009.5	CPS01	5/25/94	9.5	89	<0.53	<0.53	7.8	<1	NA	NA	NA
B32-CPS1-1-016	CPS01	5/25/94	16	150	<0.53	<0.53	5.8	<1	NA	NA	NA
B32-CPS1-1-019.5	CPS01	5/25/94	19.5	120	<0.54	<0.54	3.2	<1.1	NA	NA	NA
B32-HA1-1-000	HA01	5/10/94	0.5	98	<0.57	<0.57	6.6	<1.1	NA	NA	NA
B32-HA1-1-005	HA01	5/10/94	5	280	<0.54	<0.54	6	<1.1	NA	NA	NA
Analyses				6	6	6	6	6	0	0	0
Detections				6	0	0	6	0	0	0	0
Minimum Concentration				89	0	0	3.2	0	0	0	0
Maximum Concentration				280	0	0	7.8	0	0	0	0
HWAD - PCG				2000	1	20	20	100	100	100	20
HWAD - PCG Hits				0	0	0	0	0	0	0	0
Maximum Background Concentration				447	0.58	1.08	13.76	0	18.1	16.7	0
Background Hits				0	0	0	0	0	0	0	0

Notes:
NA = Not analyzed
Sample B32-CPS2-1-009.5 is a duplicate of B32-CPS1-1-009.5.

Arsenic
Method 7060 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Arsenic
				mg/kg
B32-CPS1-1-009.5	CPS01	5/25/94	9.5	12
B32-CPS2-1-009.5	CPS01	5/25/94	9.5	7.4
B32-CPS1-1-016	CPS01	5/25/94	16	2.3
B32-CPS1-1-019.5	CPS01	5/25/94	19.5	14
B32-HA1-1-000	HA01	5/10/94	0.5	5.9
B32-HA1-1-005	HA01	5/10/94	5	12

Analyses	6
Detections	6
Minimum Concentration	2.3
Maximum Concentration	14
HWAD - PCG	100
HWAD - PCG Hits	0
Maximum Background Concentration	18.1
Background Hits	0

Notes:

Sample B32-CPS2-1-009.5 is a duplicate of B32-CPS1-1-009.5.

Lead
Method 7421 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lead
				mg/kg
B32-CPS1-1-009.5	CPS01	5/25/94	9.5	3.4
B32-CPS2-1-009.5	CPS01	5/25/94	9.5	3.2
B32-CPS1-1-016	CPS01	5/25/94	16	4.7
B32-CPS1-1-019.5	CPS01	5/25/94	19.5	5.3
B32-HA1-1-000	HA01	5/10/94	0.5	13
B32-HA1-1-005	HA01	5/10/94	5	8.4

Analyses	6
Detections	6
Minimum Concentration	3.2
Maximum Concentration	13
HWAD - PCG	100
HWAD - PCG Hits	0
Maximum Background Concentration	16.7
Background Hits	0

Notes:
Sample B32-CPS2-1-009.5 is a duplicate of B32-CPS1-1-009.5.

Mercury
Method 7471 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Mercury
				mg/kg
B32-CPS1-1-009.5	CPS01	5/25/94	9.5	<0.1
B32-CPS2-1-009.5	CPS01	5/25/94	9.5	<0.1
B32-CPS1-1-016	CPS01	5/25/94	16	<0.1
B32-CPS1-1-019.5	CPS01	5/25/94	19.5	<0.11
B32-HA1-1-000	HA01	5/10/94	0.5	<0.11
B32-HA1-1-005	HA01	5/10/94	5	<0.11

Analyses	6
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	24
HWAD - PCG Hits	0
Maximum Background Concentration	0.108
Background Hits	0

Notes:
Sample B32-CPS2-1-009.5 is a duplicate of B32-CPS1-1-009.5.

Selenium
Method 7740 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Selenium
				mg/kg
B32-CPS1-1-009.5	CPS01	5/25/94	9.5	<1
B32-CPS2-1-009.5	CPS01	5/25/94	9.5	<1
B32-CPS1-1-016	CPS01	5/25/94	16	<0.53
B32-CPS1-1-019.5	CPS01	5/25/94	19.5	<1.1
B32-HA1-1-000	HA01	5/10/94	0.5	<0.57
B32-HA1-1-005	HA01	5/10/94	5	<0.54

Analyses	6
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	20
HWAD - PCG Hits	0

Notes:
Sample B32-CPS2-1-009.5 is a duplicate of B32-CPS1-1-009.5.

Explosives
Method 8330 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	2,4,6-TNT	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Amino-4,6-DNT	2-Nitrotoluene	3-Nitrotoluene	4-Amino-2,6-DNT
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B32-CPS1-1-009.5	CPS01	5/25/94	9.5	<1	<1	<1	<1	<1	<1	<1
B32-CPS2-1-009.5	CPS01	5/25/94	9.5	<1	<1	<1	<1	<1	<1	<1
B32-CPS1-1-016	CPS01	5/25/94	16	<1	<1	<1	<1	<1	<1	<1
B32-CPS1-1-019.5	CPS01	5/25/94	19.5	<1	<1	<1	<1	<1	<1	<1
B32-HA1-1-000	HA01	5/10/94	0.5	5.7	<1	<1	<1	<1	<1	<1
B32-HA1-1-005	HA01	5/10/94	5	0.22 J	<1	<1	<1	<1	<1	<1
Analyses				6	6	6	6	6	6	6
Detections				2	0	0	0	0	0	0
Minimum Concentration				0.22	0	0	0	0	0	0
Maximum Concentration				5.7	0	0	0	0	0	0
HWAD - PCG				233	2.6	80	NE	800	800	NE
HWAD - PCG Hits				0	0	0	NE	0	0	NE

Notes:
NE Not established
Sample B32-CPS2-1-009.5 is a duplicate of B32-CPS1-1-009.5.

Explosives
Method 8330 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	4-Nitrotoluene	HMX	m-Dinitrobenzene	Nitrobenzene	RDX	sym-Trinitrobenzene	Tetryl
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B32-CPS1-1-009.5	CPS01	5/25/94	9.5	<1	<1	<1	<1	<1	<1	<1
B32-CPS2-1-009.5	CPS01	5/25/94	9.5	<1	<1	<1	<1	<1	<1	<1
B32-CPS1-1-016	CPS01	5/25/94	16	<1	<1	<1	<1	<1	<1	<1
B32-CPS1-1-019.5	CPS01	5/25/94	19.5	<1	<1	<1	<1	<1	<1	<1
B32-HA1-1-000	HA01	5/10/94	0.5	<1	<1	<1	<1	<1	<1	<1
B32-HA1-1-005	HA01	5/10/94	5	<1	<1	<1	<1	<1	<1	<1
Analyses				6	6	6	6	6	6	6
Detections				0	0	0	0	0	0	0
Minimum Concentration				0	0	0	0	0	0	0
Maximum Concentration				0	0	0	0	0	0	0
HWAD - PCG				800	4000	8	40	64	4	800
HWAD - PCG Hits				0	0	0	0	0	0	0

.es:
NE = Not established
Sample B32-CPS2-1-009.5 is a duplicate of B32-CPS1-1-009.5.

Picric Acid
Method M8330 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Picric Acid
				mg/kg
B32-CPS1-1-009.5	CPS01	5/25/94	9.5	<0.25
B32-CPS2-1-009.5	CPS01	5/25/94	9.5	<0.25
B32-CPS1-1-016	CPS01	5/25/94	16	<0.25
B32-CPS1-1-019.5	CPS01	5/25/94	19.5	<0.25
B32-HA1-1-000	HA01	5/10/94	0.5	<0.25
B32-HA1-1-005	HA01	5/10/94	5	<0.25

Analyses	6
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	7
HWAD - PCG Hits	0

Notes:
NE = Not established
Sample B32-CPS2-1-009.5 is a duplicate of B32-CPS1-1-009.5.

Appendix D

Table 7-2
Static Pile Analytical Data
Bioremediation Pilot Study

Sample ID	Location ID	Sample Date	Depth	Lab	1,3,5-Trinitrobenzene	1,3-Dinitrobenzene	2,4,6-Trinitrotoluene	2,6-Dinitrotoluene	HMX	RDX	2-Amino-4,6-dinitrotoluene	4-Amino-2,6-dinitrotoluene
			ft		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PS-SP01-1-S	SP01	6/12/97	1.5	APCL	1.5	<0.035	7.38	<0.079	4.9	18.5	0.8	7.74
PS-SP01-2-S	SP01	6/12/97	1	APCL	1.8	<0.033	8.28	<0.073	5	18.2	1.1	6.2
PS-SP01-3-S	SP01	6/12/97	1	APCL	1.5	<0.031	5.6	<0.069	6.1	14.7	1.3	5.2
PS-SP01-4-S	SP01	6/18/97	2	APCL	<0.077	NA	13.3	<0.056	4.3	15.8	<0.053	<0.085
PS-SP01-5-S	SP01	6/18/97	2	APCL	0.96	NA	1.6	<0.055	3.9	3.2	<0.052	<0.083
PS-SP01-6-S	SP01	6/25/97	2.5	APCL	0.65	<0.039	<0.062	<0.087	<0.072	<0.078	<0.09	<0.12
PS-SP01-7-S	SP01	6/25/97	2.5	APCL	<0.018	<0.035	0.3	<0.079	2.2	<0.07	<0.081	<0.11
PS-SP01-8-S	SP01	7/2/97	2.5	APCL	<0.087	<0.047	5.1	<0.063	5.8	0.43	0.76	<0.095
PS-SP01-9-S	SP01	7/2/97	2.5	APCL	<0.086	<0.047	<0.078	<0.062	<0.081	<0.061	<0.059	<0.095
PS-SP01-10-S	SP01	7/9/97	2.5	APCL	1.2	0.42	0.35	<0.074	2.4	<0.066	<0.077	<0.1
PS-SP01-11-S	SP01	7/9/97	2.5	APCL	0.3	<0.03	0.3	<0.067	0.67	0.64	<0.069	<0.094
PS-SP01-12-S	SP01	7/9/97	2.5	APCL	0.36	<0.034	0.5	<0.076	1.6	1.1	<0.079	<0.11
PS-SP01-13-S	SP01	7/15/97	2	APCL	<0.017	0.39	<0.053	<0.074	5.9	<0.066	<0.077	<0.1
PS-SP01-14-S	SP01	7/15/97	2	APCL	0.57	<0.033	0.35	<0.073	3.6	1.3	<0.076	<0.1
PS-SP01-15-S	SP01	7/23/97	2.5	APCL	<0.018	<0.034	0.3	<0.076	<0.063	<0.068	<0.079	<0.11
PS-SP01-16-S	SP01	7/23/97	2.5	APCL	<0.017	<0.033	<0.052	<0.073	<0.06	<0.066	<0.076	<0.1
PS-SP01-17-S	SP01	7/30/97	2.5	APCL	<0.085	<0.046	<0.076	<0.061	<0.079	<0.06	<0.058	<0.093
PS-SP01-18-S	SP01	7/30/97	2.5	APCL	<0.087	<0.047	<0.079	<0.063	<0.081	<0.061	<0.06	<0.096
PS-SP01-19-S	SP01	8/6/97	2.5	APCL	0.77	<0.047	<0.078	<0.063	<0.081	<0.061	<0.06	<0.095
PS-SP01-20-S	SP01	8/6/97	2.5	APCL	<0.086	<0.047	<0.078	<0.062	<0.081	<0.061	<0.059	<0.095
PS-SP01-21-S	SP01	9/26/97	4	APCL	<0.08	<0.043	<0.072	1.3	<0.075	<0.056	NA	<0.088
PS-SP01-22-S	SP01	9/26/97	4	APCL	<0.076	<0.041	<0.069	<0.055	<0.071	0.82	NA	<0.084
PS-SP01-23-S	SP01	9/26/97	4	APCL	<0.078	<0.042	<0.071	<0.056	<0.073	<0.055	NA	<0.086
PS-SP01-24-S	SP01	9/26/97	4	APCL	<0.083	<0.045	<0.075	<0.06	<0.078	<0.059	NA	<0.091
Analyses					24	22	24	24	24	24	20	24
Detections					10	2	12	1	12	10	4	3
Minimum Concentration					0.3	0.39	0.3	1.3	0.67	0.43	0.76	5.2
Maximum Concentration					1.8	0.42	13.3	1.3	6.1	18.5	1.3	7.74
HWAD - PCG					4	8	233	80	4000	64	NE	NE
HWAD - PCG Hits					0	0	0	0	0	0	NE	NE

Notes:
NA = Not analyzed
NE = Not established

Since the reported explosive compound concentrations are very low, and no temporal trend in the levels is observed, it cannot be stated categorically that remediating soils using the static bioremediation method is effective. However, temperature and vapor monitoring data indicate that an aerobic biodegradation process was occurring within the static pile, and there is at present no reason to suspect that the static method would not be effective during future tests. In

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result [illegible] 99-06966-9	[illegible] 99-06966-10
NITROAROMATICS AND NITROAMINES					
Dilution Factor				10	10
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	7.9	7.7
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	3	2J
1,3-DINITROBENZENE	8330	mg/kg	0.25	<3.1	<3.1
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<3.1	<3.1
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<3.1	<3.1
HMX	8330	mg/kg	0.25	42	25
NITROBENZENE	8330	mg/kg	0.25	<3.1	<3.1
3-NITROTOLUENE	8330	mg/kg	0.25	<3.1	<3.1
RDX	8330	mg/kg	0.25	289	230
TETRYL	8330	mg/kg	0.25	<3.1	<3.1
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	7.3	5.3
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	138	94
2-NITROTOLUENE [a]	8330	mg/kg	0.25	<3.1	<3.1
4-NITROTOLUENE [a]	8330	mg/kg	0.25	<3.1	<3.1

Component Analyzed	Method	Unit	PQL	Analysis Result [illegible] 99-06966-11	SMB32-HOLE-01-P 99-06966-12
MOISTURE	ASTM-D2216	%Moisture	0.5	14.6	21.8
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.23	<0.26
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.23	<0.26
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.29	<0.32
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.29	<0.32
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.29	<0.32
HMX	8330	mg/kg	0.25	<0.29	<0.32
NITROBENZENE	8330	mg/kg	0.25	<0.29	<0.32
3-NITROTOLUENE	8330	mg/kg	0.25	<0.29	<0.32
RDX	8330	mg/kg	0.25	0.77	0.2J
TETRYL	8330	mg/kg	0.25	<0.29	<0.32
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.29	0.2J
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.38	0.33
2-NITROTOLUENE [a]	8330	mg/kg	0.25	<0.29	<0.32
4-NITROTOLUENE [a]	8330	mg/kg	0.25	<0.29	<0.32

Component Analyzed	Method	Unit	PQL	Analysis Result SMB32-HOLE-02-P 99-06966-13	SMB32-HOLE-03-P 99-06966-14
MOISTURE	ASTM-D2216	%Moisture	0.5	11.0	4.6

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result SMB32-HOLE-02-P 99-06966-13	Analysis Result SMB32-HOLE-03-P 99-06966-14
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.22	<0.21
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.22	<0.21
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.28	<0.26
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.28	<0.26
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.28	<0.26
HMX	8330	mg/kg	0.25	<0.28	<0.26
NITROBENZENE	8330	mg/kg	0.25	<0.28	<0.26
3-NITROTOLUENE	8330	mg/kg	0.25	<0.28	<0.26
RDX	8330	mg/kg	0.25	<0.28	<0.26
TETRYL	8330	mg/kg	0.25	<0.28	<0.26
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.28	<0.26
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.28	<0.26
2-NITROTOLUENE (a)	8330	mg/kg	0.25	<0.28	<0.26
4-NITROTOLUENE (a)	8330	mg/kg	0.25	<0.28	<0.26

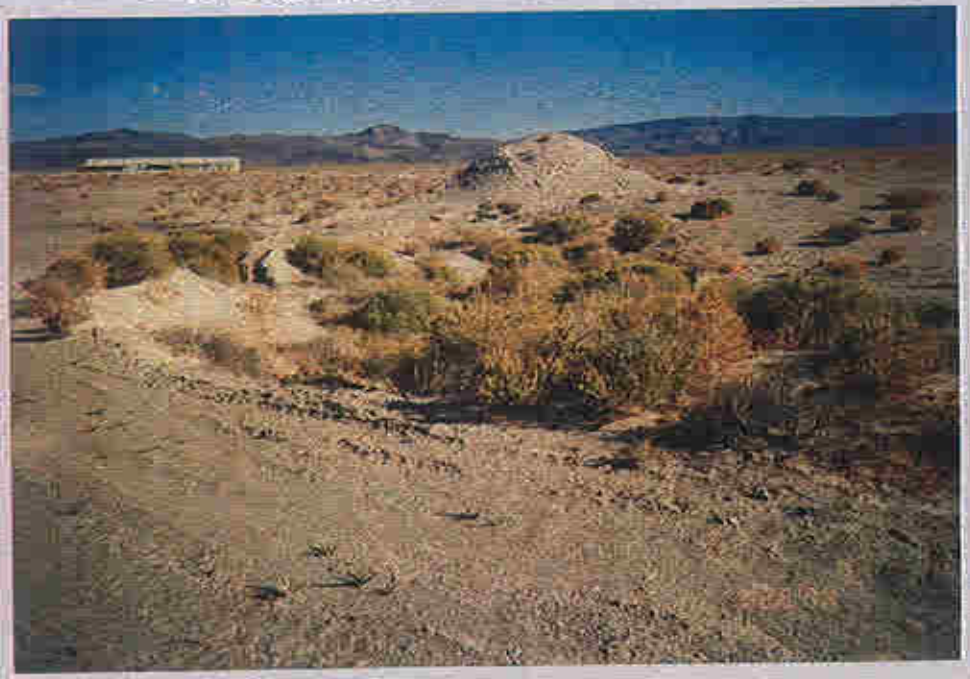
Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR007E-C001-CC001-P 99-06966-1	Analysis Result A3-WR007E-C002-CC001-P 99-06966-2
Dilution Factor				1	1
PICRIC ACID	M8330	mg/kg	2.5	<4.5	<3.9

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR007E-C003-CC001-P 99-06966-3	Analysis Result A3-WR007E-C004-CC001-P 99-06966-4
Dilution Factor				1	1
PICRIC ACID	M8330	mg/kg	2.5	<4.2	<4.0

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR007E-C005-CC001-P 99-06966-5	Analysis Result P2-WR003B-C001-CC001-P 99-06966-6
Dilution Factor				1	1
PICRIC ACID	M8330	mg/kg	2.5	<6.0	<3.5

Component Analyzed	Method	Unit	PQL	Analysis Result P2-WR003B-C002-CC001-P 99-06966-7	Analysis Result P2-WR003B-C003-CC001-P 99-06966-8
Dilution Factor				1	1
PICRIC ACID	M8330	mg/kg	2.5	<3.2	<3.3

Appendix E



SWMU B-32: Facing due south with dredge pile at southeast end of impoundment. R1N14. 9/26/94.

SWMU B-32: Facing north with Building 101-41 in the background. A 4" galvanized steel discharge pipe on northern end of impoundment. R1N15. 9/26/94.

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